R E M A R K S

A minor additional revision was made to page 12 of the Substitute Specification. Enclosed is a MARKED UP VERSION OF THE AMENDMENTS TO THE SUBSTITUTE SPECIFICATION.

Claim 14 was rejected under 35 USC 112, first paragraph, for the reasons set forth in the paragraph bridging pages 2 and 3 of the Office Action.

The amendment to claim 14 involving "1000 ppm" is supported in the original specification on page 2, line 23 and page 4, line 10.

Such amendment serves to avoid the 35 USC 112 rejection.

Withdrawal of the 35 USC 112, first paragraph rejection is therefore respectfully requested.

The other amendments to the claims involve subject matter which is generally supported by the claims prior to the final rejection. It is noted that the term "conventional alloyed zinc powder" is supported in the original specification on page 5, lines 10 to 11. The term "conventional zinc powders" is referred to in column 1, line 64 and column 2, line 20 of USP 6,022,639 of Urry.

Enclosed is a MARKED UP VERSION OF THE AMENDMENTS TO THE CLAIMS.

With respect of Rule 116, entry of the amendments is respectfully requested, since the amendments serve to address a

35 USC 112 rejection set forth in the final rejection and serve to advance the prosecution of the application.

The present inventor discovered that when a powder of metallic bismuth is added to a zinc alloy powder and the resulting mixture is used for the production of an active material for a negative electrode in an alkaline cell, an improved active material is obtained.

Claims 1, 2, 6 to 8 and 12 were rejected under 35 USC 102 as being anticipated by Glaeser USP 5,240,793.

The Examiner took the position that Glaeser teaches a zinc powder for alkaline batteries having an indium content of 10 to 10,000 ppm and additional contains 10 to 10,000 ppm bismuth (middle of page 7 of the March 28, 2001 Office Action (Paper No. 3)).

However, such a zinc powder is no more than one of the well-known prior art powders discussed in applicants' specification (see page 1, penultimate line through page 2, line 2 of the originally filed specification or page 2, lines 2 to 6 of the Substitute Specification).

As explained on page 1, the fourth line from the bottom to page 2, line 4 of the originally filed specification, "alloying zinc" was one of the established techniques for controlling hydrogen generation from zinc powder to be used in an alkaline cell. Stated differently, for alloying zinc, zinc alloys

including some components selected from the group consisting of Al, Bi, In, Ga, Sn, Pb, and the like, have heretofore primarily been used in a manner that a ratio of these elements to zinc was optimized relative to gas generation. Such a zinc alloy powder containing optimized amounts of additional elements such as Al, Bi, In, etc., is referred to as "conventional alloyed zinc powder" in applicants' specification.

However, to realize only such optimization ratio is not sufficient (see page 2, lines 2 to 7 of the Substitute Specification). This means that by changing the amounts of the components mentioned above, a zinc alloy can be prepared so that the amount of gas generation can be minimized when used in the negative electrode active material, but there is a certain limit with respect to suppressing hydrogen gas generation. The problem is that this result was not satisfactory for consumers.

Glaeser does not teach or suggest how one can solve this problem and improve the insufficient results of controlling gas generation.

The present inventor discovered that the addition of a powder of either Bi or In to a "conventional alloyed zinc powder" for use in a cell substantially improves the conventional alloyed zinc powder and produces a new product having an enhanced result for suppressing hydrogen gas generation. Particularly, the addition of Bi powder is very effective as shown in Table 1 on

page 11 of the Substitute Specification and in Fig. 1 of the present specification, which are reproduced as follows:

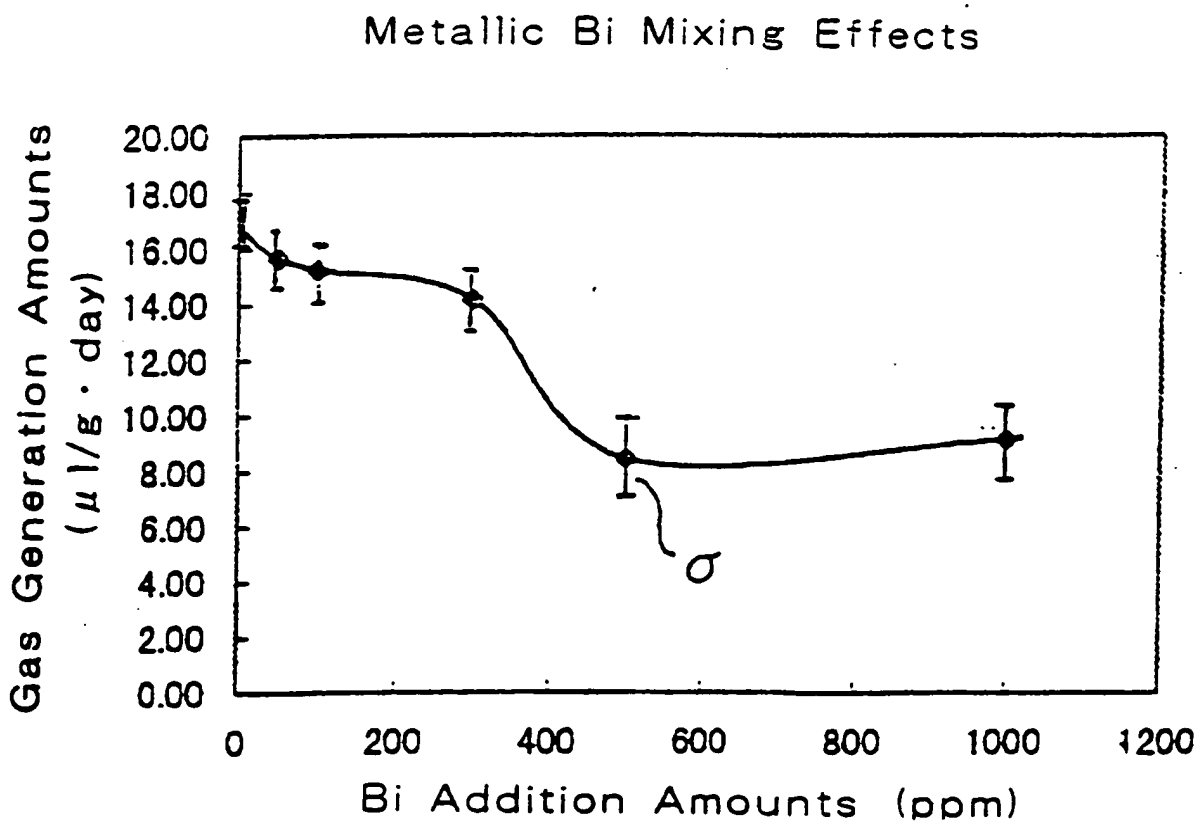
Table 1

Gas Generation

(μl/g · day)

	Addition Amounts of Metallic Bi Powder (ppm)				
	50	100	300	500	1000
No. 1	16.52	16.34	14.61	9.99	10.31
No. 2	14.37	14.80	14.49	7.73	4.67
No. 3	17.53	15.81	14.73	8.21	8.90
No. 4	15.38	15.02	15.90	9.34	11.94
No. 5	14.50	14.3	11.07	6.93	9.77
Average	15.66	15.25	14.16	8.44	9.12
Standard Deviation	1.353	0.815	1.817	1.230	2.722

Fig. 1



The Examiner also took the position that Glaeser teaches a zinc powder and a process for preparing the zinc powder for alkaline batteries and a process for preparing the powder with a very low gas evolution in the alkaline electrolyte by "alloying or applying" metal "into or onto" zinc (see the middle of page 7 of the March 28, 2001 Office Action).

However, the unexpected results afforded by the present invention can be attained only when both "alloying into metal" and "applying onto metal" are conducted simultaneously. The metal to be alloyed into zinc and the metal to be alloyed onto zinc need not be the same. Moreover, the application of Bi onto the "conventional alloyed zinc powder" provides much better results than the application of In onto the "conventional alloyed zinc powder". This position of the applicant is supported by the results shown in Table 1 and Table 2 on pages 11 and 13, respectively, of the Substitute Specification, as well as by Fig. 1 and Fig. 2 of the application.

Accordingly, it is respectfully submitted that the present invention is not anticipated and not rendered obvious by Glaeser.

Claims 1, 6 to 8 and 12 were rejected under 35 USC 102 as being anticipated by Urry USP 6,022,639.

Claims 4, 5, 10, 13 and 14 were rejected under 35 USC 103 as being unpatentable over Urry USP 6,022,639.

The object of Urry is substantially different from that of

the present invention. Accordingly, Urry's disclosure is not based on the discovery made by the present inventor of substantially reducing hydrogen gas generation.

Urry discloses that "indium can be coated on the alloys in an amount of 10 to 500 ppm, preferably between 20 to 200 ppm" (column 4, lines 5 to 6). That is, Urry discloses one of the "conventional alloyed zinc powders" for use in negative electrode active material, which comprises alloyed zinc particles on which indium is coated (column 4, lines 4 to 6).

This description in Urry clearly shows that metallic In must be used in an amount of 10 to 500 ppm, preferably in an amount of 20 to 200 ppm. In contrast thereto, the present specification describes that the addition of Bi or In is preferably within a range of 50 to 1000 ppm based on the weight of zinc alloy powder for use in a cell to obtain the desired result (see page 9, lines 16 to 23 of the Substitute Specification). Moreover, it is described that a mixing amount of Bi or In should be 500 ppm or more in order to obtain a remarkable effect (page 11, lines 7 to 10 of the substitute specification). Tables 1 and 2, as well as Figs. 1 and 2 of the present application, also clearly show that a remarkable effect is obtainable only when Bi or In is added in an amount of 50 ppm or more. Further, such Tables and the Figures show that the effect of Bi addition is much better than the effect of In addition.

Table 2 and Fig. 2 of the present application are reproduced as follows:

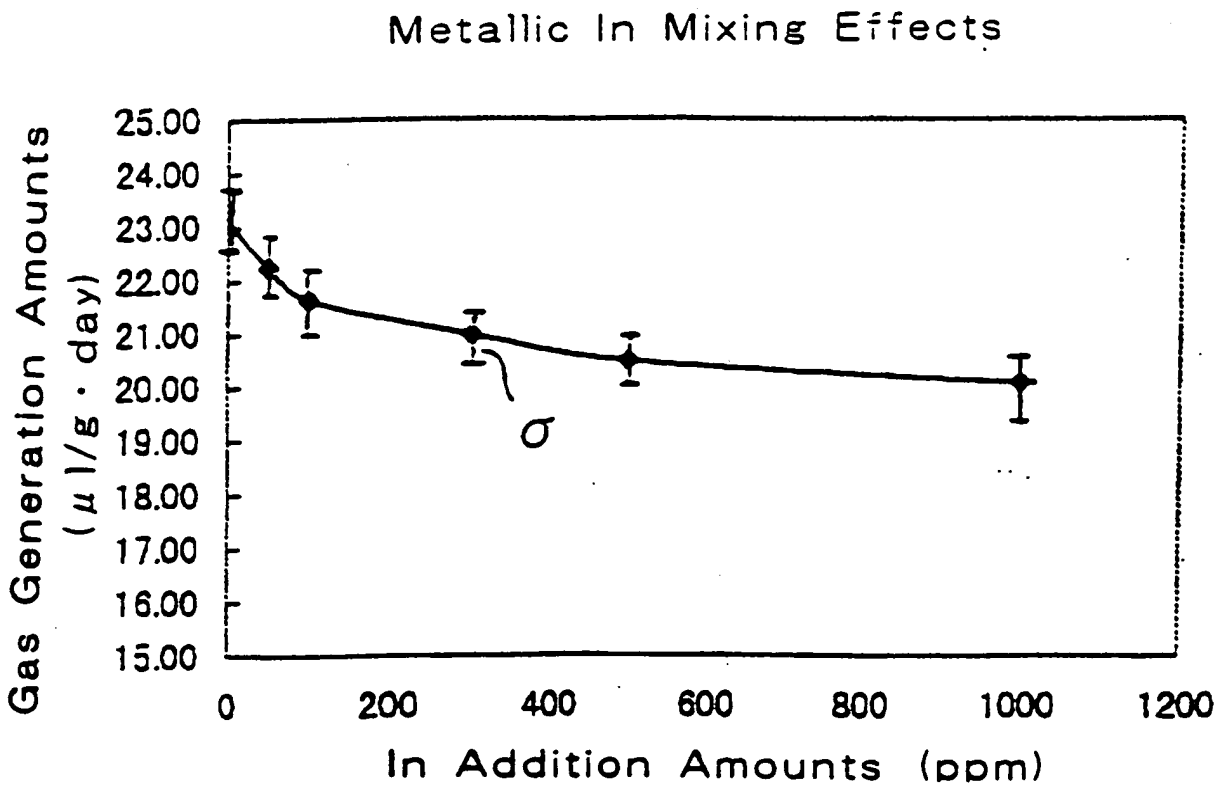
Table 2

Gas Generation

(μl/g · day)

	Addition Amounts of Metallic In Powder (ppm)				
	50	100	300	500	1000
No. 1	22.67	20.00	22.67	19.33	21.33
No. 2	22.00	22.67	21.33	22.87	18.82
No. 3	22.00	22.72	18.00	20.00	20.33
No. 4	22.00	22.67	23.33	20.09	20.67
No. 5	22.45	20.01	19.45	20.03	19.21
Average	22.22	21.61	20.96	20.46	20.07
Standard Deviation	0.335	1.344	2.372	1.569	1.063

Fig. 2



Urry teaches a range of amount of Bi which is different from that of applicant's claim 14. Moreover, it should be noted that the effect of adding Bi is much better than that of adding In. Thus, Bi and In cannot be regarded as an equivalent of each other.

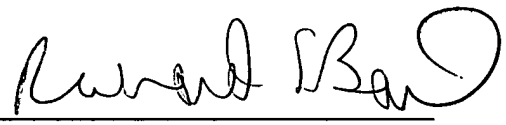
It is therefore respectfully submitted that applicant's claimed invention is not anticipated and is not rendered obvious by Urry.

Reconsideration is requested. Allowance is solicited.

The Examiner's attention is directed to copending related application Serial No. 09/541,942, filed April 3, 2000.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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Enclosures: (1) PETITION FOR EXTENSION OF TIME

(2) MARKED UP VERSION OF THE AMENDMENTS TO THE SUBSTITUTE SPECIFICATION

(3) MARKED UP VERSION OF THE AMENDMENTS TO THE CLAIMS

MARKED UP VERSION OF THE AMENDMENTS TO THE SUBSTITUTE SPECIFICATION

Page 12, last paragraph of the Substitute Specification:

From the test results, it has been confirmed that mixing of metallic indium is effective in controlling gas generation since the gas[.] generation was gradually decreased with an increase of metallic indium mixing in each sample.

MARKED UP VERSION OF THE AMENDMENTS TO THE CLAIMS

1. (Twice Amended) A negative electrode active material for use in an alkaline cell comprising a mixture of a conventional alloyed zinc [alloy] powder and Bi as an additional metal [selected from the group consisting of Bi and In].

2. (Twice Amended) A negative electrode active material for use in an alkaline cell comprising a mixture of a conventional alloyed zinc [alloy] powder and Bi as an additional metal [selected from the group consisting of Bi and In] incorporated [therein] in said mixture in an amount of 50 - 1000 ppm by weight based on the amount of said conventional alloyed powder.

6. (Twice Amended) A negative electrode active material for use in an alkaline cell of low gas generation comprising a mixture of a powder of [a metal selected from the group consisting of] Bi and [In] a conventional alloyed zinc [alloy] powder, said mixture being prepared by dry mixing said metallic powder and said conventional alloyed zinc [alloy] powder.

7. (Twice Amended) A method of preparing a negative electrode active material for use in an alkaline cell comprising

the step of mixing a conventional alloyed zinc [alloy] powder with Bi as an additional metal [selected from the group consisting of Bi and In].

8. (Twice Amended) A method of preparing a negative electrode active material for use in an alkaline cell comprising the step of mixing a conventional alloyed zinc [alloy] powder with Bi as an additional metal [selected from the group consisting of Bi and In], said additional metal being added in an amount of 50 to 1000 ppm by weight based on the weight of the conventional alloyed zinc [alloy] powder.

12. (Twice Amended) A method of preparing a negative electrode active material for use in an alkaline cell of low gas generation comprising the step of dry mixing a conventional alloyed zinc [alloy] powder with a powder of [an additional metal selected from the group consisting of] Bi [and In].

14. (Amended) The negative electrode active material for use in an alkaline cell according to [claim 13] claims 1 or 2, wherein the bismuth is added in an amount [which is no less than] of 500 to 1000 ppm.